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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexerity; and Manual Dexerity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

ED 059282

TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

STOCK CLERK II 1-38.01

B-190 or S - 2

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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U. S. Employment Service in
Cooperation with
California State Employment Service

U. S. DEPARTMENT OF LABOR
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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR STOCK CLERK II 1-38.01

B-190 or S-2

Summary

In August 1945, the General Aptitude Test Battery, B-1001, was administered to 32 women employed as Stock Clerk II 1-38.01 by the U. S. Naval Supply Depot, Oakland, California. One woman was eliminated from the sample, leaving a final experimental sample of 31. Broad category supervisory ratings were used as the criterion. On the basis of the statistical results of this study and the job analysis, the following aptitudes were found to be significant: (N) Numerical Aptitude, (Q) Clerical Aptitude, (F) Finger Dexterity, and (M) Manual Dexterity.

GATB Norms for Stock Clerk II 1-38.01 - B-190 or S-2

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Stock Clerk II 1-38.01.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
N	CB-1-D CB-1-I	80	N	Part 2 Part 6	75
Q	CB-1-B	70	Q	Part 1	75
F	CB-1-O CB-1-P	70	F	Part 11 Part 12	65
M	CB-1-M CB-1-N	80	M	Part 9 Part 10	80

Effectiveness of Norms

The data in Table IV indicate that 7 of the 10 poor workers, or 70 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 70 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 16 of the 19 workers who made qualifying test scores, or 84 percent, were good workers.

TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Stock Clerk II 1-38.01.

II. Sample

In August 1945, the General Aptitude Test Battery, B-1001, was administered to 32 women employed as Stock Clerk II 1-38.01 by the U. S. Naval Supply Depot, Oakland, California. One worker was disqualified because of a physical disability which interfered with her performance on the apparatus tests, leaving a final experimental sample of 31. Presumably the workers were selected for employment according to Civil Service procedures. Table II shows the means, standard deviations, ranges, Pearson product-moment correlations (corrected for broad categories) with the criterion, and the standard errors of correlation for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$) and the Standard Errors of Correlation ($\sigma_{c}r$) for Age, Education, and Experience

Stock Clerk II 1-38.01

N = 31

	M	σ	Range	$_{c}r$	$\sigma_{c}r$
Age (years)	25.5	6.2	19-44	-.075	.179
Education (years)	12.2	1.5	9-16	.034	.179
Experience (months)	9.8	6.7	1-31	.202	.172

None of the variables shows significant correlation with the criterion. The mean and dispersion of each variable show no indications that this sample is not suitable for test development purposes.

III. Job Description

Job Title: Stock Clerk II 1-38.01

Job Summary: Stores and issues spare parts for aeronautical equipment, such as radios, engines and wings. Identifies and stores incoming parts by checking their code numbers and symbols, and characteristics such as size and form, against those of stock already stored in bins. Checks small radio and radar parts by matching their color markings, voltage, and other characteristics, with catalogue descriptions. Refers to catalogues and tables to obtain identifying information

for stock that is lacking proper identification. Wraps or boxes specified quantities of small items and labels packaged stock to identify it. Stores stock in proper bins. Fills orders by obtaining required parts from bins and storage racks and checking them against invoices. Rewraps and rearranges stock to make space for additional supplies. Periodically checks metal parts for corrosion and cellophane-wrapped parts for humidity content, and reports findings.

Work Performed:

1. Identifies incoming parts. Transports stock from storage receiving section to appropriate stockroom row and bin, using a dolly, hand truck, or portable table. Verifies code numbers and symbols of incoming stock against those of stock already stored in bins. Compares incoming stock with stock in bins, by observing size, color, form, and other distinguishing features. Determines identity of small radio and radar parts by observing color markings and by computing voltage and other electrical characteristics necessary to identify part with catalogue coding description.

2. Identifies unlabelled or incorrectly labelled parts. Refers to U. S. Government Tables prepared by the Aviation Supply Office, and to industrial parts catalogue, and checks office records of incoming stock lacking proper identification in order to obtain information necessary to identify parts. May refer stock bearing no identification number to supervisor for the assignment of a temporary or permanent number.

3. Wraps and labels stock for storage. Counts specified number of small items or weighs out specified amounts, using scales. Manually wraps or boxes items for storage. Marks packaged stock with proper identification number, using pen, pencil or crayon, or glues on typewritten labels.

4. Stores stock. Places stock into proper bins, using system in which bins are coded alphabetically from left to right and numerically from top to bottom. Climbs ladder or bins to reach into bins that are above shoulder level.

5. Issues parts. Locates material requested on invoices received from supervisor. Obtains required material from bins and surplus storage racks. Visually inspects parts for corrosion, wear, or damage before sending them out. Assembles combinations of parts, according to names and numbers of parts. Delivers completed orders for inspection before shipment.

6. Performs miscellaneous tasks. Rearranges stock to make room for additional supplies, repacking or rewrapping stock into more convenient parcels. Relabels and replaces stock to provide readily identifiable stock arranged in a correct, neat, and orderly manner. Periodically examines ordnance and other metal parts for corrosion and cellophane-wrapped parts for humidity content. Reports parts affected by rust or humidity. Wraps metal parts coated with grease in air-tight paper wrapper.

IV. Experimental Battery

All of the tests of the GATB, B-1001, were administered to the experimental sample.

V. Criterion

The criterion consists of supervisory ratings expressed in broad categories. Pooled ratings were made by three supervisors: the Officer-In-Charge of General Stores; the Storekeeper-In-Charge; and a Section Supervisor. Another Section Supervisor felt that he knew only the workers in his section well enough to rate them. His rating, therefore, covers only his workers. In the pooled rating, his judgment was added to the judgments of the other three supervisors for the workers under his supervision. Each supervisor placed the workers he rated in three groups--high, middle and low. In the combined rating, the workers also were placed in three groups based on the individual ratings. Letter values of A (high), B (middle), and C (low) were assigned.

Re-ratings were made in the same manner nineteen days after the first ratings. High agreement between the ratings indicated that the criterion data were reliable.

These two ratings were combined, which resulted in workers being placed in each of five groups as follows: AA - 6 workers; AB - 12 workers; BB - 13 workers; BC - 4 workers; and CC - 6 workers. For computational purposes, the letter designations of AA, AB, BB, BC and CC were converted to numerical values of 64, 58, 51, 43, and 36, respectively.

VI. Statistical and Qualitative Analysis

Table III shows the means, standard deviations, Pearson product-moment correlations (corrected for broad categories) with the criterion, and the standard errors of correlation for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), Pearson Product-Moment Correlations (Corrected for Broad Categories) with the Criterion ($_{c}r$), and the Standard Errors of Correlation ($\sigma_{c}r$) for the Aptitudes of the GATB

Stock Clerk II 1-38.01
N = 31

Aptitudes	M	σ	$_{c}r$	$\sigma_{c}r$
G-Intelligence	88.5	13.1	.190	.173
V-Verbal Aptitude	88.6	12.8	-.104	.178
N-Numerical Aptitude	90.6	13.1	.453*	.143
S-Spatial Aptitude	90.1	16.2	.089	.178
P-Form Perception	90.5	16.2	.085	.178
Q-Clerical Perception	93.0	16.2	-.022	.180
A-Aiming	89.1	18.3	.096	.178
T-Motor Speed	88.1	17.4	-.041	.179
F-Finger Dexterity	91.1	16.6	.130	.177
M-Manual Dexterity	93.0	14.7	-.009	.180

*Significant at the .05 level.

The statistical results were interpreted in the light of the job analysis data. On this basis, the following aptitudes measured by the GATB appeared to be important to successful job performance:

Numerical Aptitude (N) - required to check items against orders or invoices, which involves elementary arithmetic computation.

Clerical Perception (Q) - required to identify items of stock for proper storage and to locate material requested on invoices, which involve careful comparisons of code numbers and symbols.

Finger Dexterity (F) and Manual Dexterity (M) - required in the ability to handle, quickly and efficiently, a variety of items usually carried in stock.

From Table III, it may be seen that Aptitudes N, S, P, Q, F, and M have the highest means for this sample. Aptitudes G, V, and N have the lowest standard deviations. The correlation between Aptitude N and the criterion is significant at the .05 level.

Aptitudes N, Q, F, and M, for which statistical and job analysis data show evidence of importance for successful job performance, were chosen for inclusion in the norms. Cutting scores for Aptitudes N and M were set one standard deviation below the mean rounded to the nearest five-point score level. The cutting scores for Aptitudes Q and F were lowered five points from one sigma below the mean and rounded to the nearest five point score level in order to improve the selective efficiency of the norms. The resulting norms consist of N-80, Q-70, F-70, and M-80.

VII. Concurrent Validity of Norms

In order to compute the tetrachoric correlation coefficient and Chi Square value, the criterion was dichotomized. Approximately one-third of the sample was placed in the low criterion group, which included all workers who had final criterion ratings of BC or CC. Table IV shows the relationship between test norms consisting of Aptitudes N, Q, F, and M with critical scores of 80, 70, 70, and 80, respectively and the criterion for Stock Clerk II 1-38.01. Workers in the high criterion group have been designated as "good workers" and those in the low group as "poor workers."

TABLE IV

Relationship Between Test Norms Consisting of Aptitudes N, Q, F, and M with Critical Scores of 80, 70, 70, and 80, Respectively, and the Criterion

Stock Clerk II 1-38.01
N = 31

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	5	16	21
Poor Workers	7	3	10
Total	12	19	31

$r_{tet} = .67$ $\quad \chi^2 = 4.301$

$\sigma_{r_{tet}} = .30$ $\quad P/2 < .025$

The data in the above table indicate a significant relationship between the test norms and the criterion for this sample.

VIII. Conclusions

On the basis of all the foregoing data, it is recommended that Aptitudes N, Q, F, and M with minimum scores of 80, 70, 70, and 80, respectively be used as B-1001 norms for Stock Clerk II 1-38.01. Equivalent B-1002 norms consist of N-75, Q-75, F-65, and M-80.